PAUL SCHERRER INSTITUT

PSI

GFA & SwissFEL Accelerator Seminar

A brand-new Hall sensor for 3D magnetic field measurements

Monday, 22 June 2015, 16.00 h, WBGB/019

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It remains a challenge to measure simultaneously all three components of a magnetic field vector with high precision. This is disappointing given that current Hall sensors dedicated to measure a single magnetic field component are high precision state-of-the-art devices. Three-axis Hall sensors suffer from either, or a combination, of the following: poor spatial resolution, noise, cross-talk between measurement axes, the lack of possibility to measure in a single point in space and time. At PSI a novel three-axis Hall sensor has been designed which is comprised of conventional Hall sensors in a miniature active volume of 200 µm x 200 µm x 200 µm. Due to its unique form, the sensor provides a high spatial resolution, full field vector measurements practically in a single point in space and time as well as a significant compensation of the planar Hall effect. The sensor's development will be presented along with its characterisation to prepare it for its benchmark magnetic field measurements. Measurements of the SwissFEL Laser Heater U50 of the Insertion Devices Group at PSI are planned and the results will be presented.